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EPA Superfund
Record of Decision:

ELLSWORTH AIR FORCE BASE
EPA ID: SD2571924644
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ELLSWORTH AFB, SD
05/16/1995

Final
Record of Decision for
Interim Action at Operable Unit 1
The Fire Protection Training Area
Ellsworth Air Force Base, South Dakota

United States Air Force
Air Combat Command
Ellsworth Air Force Base

May, 1995

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1.0 DECLARATION

1.1 SITE NAME AND LOCATION

Operable Unit 1 (OU-1), the former Fire Protection Training Area (FPTA), Ellsworth Air Force Base (EAFB) National Priorities List Site.

Meade and Pennington Counties, South Dakota

1.2 STATEMENT OF BASIS AND PURPOSE

This decision document describes EAFB's selected interim remedial action for OU-1, in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision is based on the contents of the Administrative Record for OU-1, EAFB. The United States Environmental Protection Agency Region VIII (EPA) and the South Dakota Department of Environment and Natural Resources (SDDENR) concur with the selected interim remedial action.

1.3 ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this OU, if not addressed by implementing the interim remedial action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

1.4 DESCRIPTION OF SELECTED REMEDY

Twelve potentially contaminated areas, or OUs, have been identified at EAFB. This ROD is for an interim action at OU-1 and is the first ROD for EAFB. The ROD for the final action for OU-1 will be prepared in April 1996.

The selected interim action remedy for soil and ground-water contamination cleanup at OU-1 consists of:

- soil vapor extraction (SVE),
- ground-water removal by wells and an existing interceptor trench,
- treatment of soil gas, condensate, and ground-water, and
- surface discharge of treatment effluent.

SVE wells will be installed in the burn-pit area of the former FPTA to remove source-area contamination from the soil. Some of the SVE wells will also be constructed to allow for the removal of contaminated ground-water beneath the burn-pit area. An existing interceptor trench, located immediately downgradient of the burn-pit area, will also collect and remove contaminated ground-water. The removed soil gas, condensate, and ground-water, containing volatile organic compounds (VOCs) and petroleum related hydrocarbons, will be treated. The liquid treatment will consist of gravity separation, air stripping, solids filtration, and use of liquid phase granular activated carbon.

The soil gas and air-stripper off-gas will be treated by thermal oxidation. The liquid effluent from this treatment system will be discharged to a natural surface water drainage. The discharge will be in compliance with the requirements of the Clean Water Act. The drainage leads to a retention pond. The discharge from the pond is regulated under the National Pollution Discharge Elimination System (NPDES) program.

1.5 STATUTORY DETERMINATIONS

This interim action is protective of human health and the environment, complies with action- and location-specific Federal and State applicable or relevant and appropriate requirements (ARARs), and is cost effective. However, since this is an interim action, the interim action waiver is being invoked for chemical-specific ARARs. These ARARs will be met in the final cleanup action.

Although this interim action is not intended to fully address the statutory mandate for permanence and treatment to the maximum extent practicable, this interim action does utilize treatment and is in furtherance of that statutory mandate. Because this action does not constitute the final remedy for OU-1, the statutory preference for remedies that employ treatment that reduce toxicity, mobility, or volume as a principle element, although partially addressed in this remedy, will be addressed by the final response action. Subsequent actions are planned to fully address the threats posed by conditions at OU-1.

Because this remedy will result in hazardous substances remaining at the OU above health-based levels, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after commencement of the final action. Because this is a ROD for an interim action, review of this OU and of this remedy will be ongoing as the Air Force continues to develop final remedial alternatives for OU-1.

1.6 SIGNATURE AND AGENCY CONCURRENCE ON THE REMEDY

<IMG SRC 0895108>

_____ _____

THAD A. WOLFE Date
Lieutenant General, USAF
Vice Commander

<IMG SRC 0895108A>

_____ _____

ROBERT L. DUPREY, Director Date
Hazardous Waste Management Division
US Environmental Protection Agency Region VIII

<IMG SRC 0895108B>

_____ _____

NETTIE H. MYERS, Secretary Date
Department of Environment and Natural Resources
State of South Dakota

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND DESCRIPTION

Ellsworth Air Force Base (EAFB) is a U.S. Air Force Air Combat Command (ACC) installation located 12 miles east of Rapid City, South Dakota, and adjacent to the small community of Box Elder (Figure 2-1). EAFB covers approximately 4,858 acres within Meade and Pennington counties and includes runways and airfield operations, industrial areas, and housing and recreational facilities (Figure 2-2). Open land, containing a few private residences, lies adjacent to EAFB on the north, south, and west. Ranches lie to the north and west of the Base and residential and commercial areas lie to the east of the Base. Residences and ranches lie south of EAFB.

OU-1 contains the former Fire Protection Training Area (FPTA) and is located in the southwestern segment of EAFB, northwest of the alert apron and east of Kenney (formerly Bismarck) Road (Figure 2-2). OU-1 covers approximately 10 acres and consists of a centrally located bermed burn pit, a steel aircraft mock-up, and surrounding land. No containment (liner) was installed under the former FPTA. The burn-pit area of the FPTA is the source area of contamination.

Both humans and livestock have used shallow (less than 70 feet below grade) ground-water in the areas south and west of OU-1. Deeper bedrock aquifers also exist in excess of 1000 feet beneath EAFB. These deeper aquifers are separated from the shallow aquifer by 800 feet of impermeable clays and silts. In the past, EAFB utilized these deeper aquifers directly beneath the Base for its water supply. Presently, EAFB obtains its potable water from the Rapid City Municipal Distribution System. The Rapid City Municipal Distribution System obtains its water from two deep, high-capacity, wells and four surface water intakes along Rapid Creek.

Surface water from OU-1 drains to two drainage ditches which flow to a retention pond, Pond 001. Pond 001 also receives drainage from the southern area of EAFB including some of the hanger complex, the south dock area of the flight line, portions of adjoining taxiways, and runways. Outflow from Pond 001 flows off-Base to a stock dam located several hundred feet south of OU-1.

In terms of ecological value, the natural environment at OU-1 has been highly altered by activities at the former FPTA. Notwithstanding the high level of alterations, habitat features such as grassy fields, weedy fields, and wetlands are prevalent in the eastern and southern sections of the OU. These could be used intermittently by some animal species.

2.2 SITE HISTORY AND REGULATORY OVERSIGHT ACTIVITIES

2.2.1 Historical Practices

EAFB was officially activated in July 1942 as the Rapid City Army Air Base, a training facility for the B-17 bomber crews. It became a permanent facility in 1948 with the 28th Strategic Reconnaissance Wing as its host unit. Historically, EAFB has been the headquarters of operations for a variety of aircraft, as well as the Titan I Intercontinental Ballistic Missile, and the Minuteman I and Minuteman II missile systems. The Base has provided support, training, maintenance, and/or testing facilities. Presently, the 28th Bombardment Wing (B-1B bombers) and the 99th Tactics and Training Wing are the host units of EAFB.

The various training activities conducted at EAFB have included fire-protection training for Base fire-fighting personnel for preparedness in the event of fires associated with fueling spills or aircraft accidents. These training exercises took place at the former FPTA from 1942 to 1990. A steel aircraft mock-up located in the burn pit of the former FPTA was set on fire and extinguished for training exercises. The location of the burn area within the former FPTA has changed several times over the years. The training exercises conducted at the FPTA involved simulation of aircraft fires and spills and consisted of dispersing various fuels, oils, and solvents within the burn-pit area and subsequently igniting and extinguishing the fire. Extinguishing chemicals used during the fire-training exercises have included aqueous-film-forming foam, halon, protein-foams, carbon dioxide, dry chemicals and chlorobromomethane. The former FPTA at OU-1 is no longer in use and all training activity now takes place at the new FPTA.

2.2.2 Regulatory Oversight Activities

Environmental investigation activities at EAFB were initiated by the Air Force in 1985 through the preparation of an Installation Restoration Program (IRP) Phase I Installation Assessment/Records Search and Phase II, Confirmation/Quantification. The Phase I study, dated September, 1985, identified a total of 17 locations at EAFB where releases involving hazardous substances potentially occurred.

In Phase II of the IRP investigation, field activities included soil vapor surveys; geophysical surveys; soil borings; monitoring-well installation, hydrogeologic testing; and sampling and analysis of soils, ground-water, sediment, tank contents, and water from storm drains. A ground-water recovery system and treatment plant was installed, operated, and tested during September and October 1990 at OU-1. The purpose of the this system was to determine the feasibility of using a ground-water pump and treat system at OU-1.

On August 30, 1990 (55 Federal Register 35509), EAFB was listed on the U.S. EPA's National Priorities List (NPL). A Federal Facilities Agreement (FFA) was signed in January 1992 by the Air Force, EPA, and the State and went into effect on April 1, 1992. The FFA establishes a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions for EAFB in accordance with CERCLA as amended by SARA, and the NCP. It also states the oversight procedures for EPA and the State to ensure Air Force compliance with the FFA requirements. The FFA identified 11 potential source-area operable units as well as a Base-wide ground-water operable unit.

Listing on the NPL and execution of the FFA required the U.S. Air Force to perform a remedial investigation/feasibility study (RI/FS) to investigate these 12 operable units. In 1993 and 1994, an extensive RI field program was conducted to characterize site conditions at OU-1. The program included completion of boreholes, installation of monitoring wells, geotechnical analysis of soil samples, ecological investigations, assessment of human health risks, and review and compilation of previous IRP investigations. Collection and laboratory analysis of soil, ground-water, surface water, and sediment samples were included in the RI field program.

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

Community relations activities that have taken place at EAFB to date include:

- FFA process. After preparation of the FFA by the USAF, EPA, and SDDENR, the document was published for comment.
- Administrative Record. An Administrative Record for information was established in Building 8203 at EAFB. This repository contains information used to support USAF decision-making.
- Information repositories. An administrative Record outline is located at the Rapid City Library (public repository)
- Community Relations Plan (CRP). The draft final CRP was submitted on October 26, 1992 to the EPA and the State of South Dakota. The EPA and State have approved the CRP. An update to this plan will be prepared in 1995.
- Restoration Advisory Board (RAB). The RAB has been formed to facilitate public involvement in the cleanup and has meetings quarterly. In addition to USAF, EPA, and South Dakota oversight personnel, the RAB includes community leaders and local representatives from the surrounding area.
- Mailing list. A mailing list of all interested parties in the community is maintained by the Base and updated regularly.
- Fact sheets. A fact sheet describing the status of the IRP at the Base was distributed to the mailing list addressees in 1992.
- Open house. An informational meeting on the status of the IRP and other environmental efforts at the Base was held on May 6, 1993.
- Newspaper articles. Articles have been written for the Base newspaper regarding IRP activity.
- Proposed Plan. The proposed plan on this action was distributed to the mailing list addressees for their comments.

A public comment period was held from March 25 to April 24, 1995, and a public meeting was held on April 18, 1995. At this meeting, representatives from EAFB answered questions about the interim action. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this ROD.

This ROD is based on the contents of the Administrative Record for OU-1, in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution

Contingency Plan (NCP). The remedial investigation and focused feasibility study reports and the Proposed Plan for OU-1 provide detailed information about the OU and interim action. These documents are available at the Information Repositories at EAFB and the Rapid City Public Library.

2.4 SCOPE AND ROLE OF RESPONSE ACTION

The FFA identified 11 potential source area operable units (OUs) as well as a Base-wide ground-water operable unit. The 12 operable units are identified as follows:

OU-1	Fire Protection Training Area
OU-2	Landfills Nos. 1 and 6
OU-3	Landfill No. 2
OU-4	Landfill No. 3
OU-5	Landfill No. 4
OU-6	Landfill No. 5
OU-7	Weapons Storage Area
OU-8	Explosive Ordnance Disposal Area (Pramitol Spill)
OU-9	Old Auto Hobby Shop Area
OU-10	North Hangar Complex
OU-11	Base-wide Ground-water
OU-12	Hardfill No. 1

This ROD is for an interim remedial action (IRA) at OU-1 and is the first ROD for EAFB. The objective of the IRA at OU-1 is to reduce the immediate risks posed by the contaminants in the deeper subsurface soils of the burn-pit areas of the FPTA and to prevent the movement of contaminants to shallow ground-water. The IRA also includes removal and treatment of contaminated ground-water immediately downgradient of the burn-pit area. This will contain the portion of the ground-water with the highest contaminant concentrations. Implementation of the IRA may result in partial restoration of the shallow ground-water immediately downgradient of the burn-pit area and reduce the concentration of contaminants in subsurface soils in the burn-pit area. The IRA does not fully address risks posed by contaminants in surface and near surface soils and the remainder of the contaminants in the shallow ground-water.

This action is not the final response action for OU-1; the ROD for the final action at OU-1 is due in April 1996. Additional remedies will be implemented at OU-1 during the final action to clean up the remaining contaminated media. The IRA will be consistent with any future actions.

2.5 SITE CHARACTERISTICS

This section describes the nature and extent of contamination as a result of past activities conducted at the OU (Figure 2-3).

2.5.1 Soils

Soils at OU-1 contain JP-4 (jet fuel), benzene, toluene, ethylbenzene and xylene (BTEX), and chlorinated volatile organic compounds (VOCs) as depicted in the following table.

Contaminant	Vadose Zone Soil (µg/kg)	Capillary Fringe Soil (µg/kg)
JP-4	100,000s to 1,000,000s	100,000s to 1,000,000s
Total BTEX	ND to 100,000s	1,000s to 10,000s
Total chlorinated VOCs	ND to 10s	ND to 100s

JP-4 concentrations are much higher than other compounds. The areal distribution of JP-4 contamination generally reflects the extent of all the contaminants in the soil (Figure 2-3). The highest concentrations of soil contamination exist in the burn-pit area, which is the source area of contamination.

2.5.2 Ground-water

Shallow ground-water exists at OU-1 and flows in the southern direction. An 800 feet thick layer of impermeable clays and silts limits the shallow aquifer from infiltrating to deeper ground-water aquifers. Therefore, these deeper aquifers were not affected by contaminants present at OU-1.

The past practices at the FPTA have resulted in the contamination of the shallow aquifer. VOCs such as trichloroethylene (TCE), benzene, perchloroethylene (PCE), 1,1-dichloroethylene (1,1-DCE) and 1,2-dichloroethane (1,2-DCA) exist in the shallow ground-water at or above established Safe Drinking Water Act Maximum Contaminant Levels (MCLs) at OU-1. Benzene represents the extent of organic compounds exceeding MCLs. The ground-water contamination does not extend beyond the Base boundary (Figure 2-3).

Dense non-aqueous-phase liquids (DNAPLs) are not present in OU-1 ground-water. However, light non-aqueous phase liquids (LNAPLs) (JP-4 and related BTEX compounds) were found in ground-water at the northern and southern ends of the FPTA.

2.6 OU-1 RISK SUMMARY

Human Health Risks

The assessment of human health risks for this OU considered the following topics:

(1) Contaminants of concern (COCs) in ground-water, surface water, sediment, and soil samples taken at OU-1;
(2) Current and future land-use conditions;
(3) Potential environmental pathways by which populations might be exposed;
(4) Estimated exposure point concentrations of COCs;
(5) Estimated intake levels of the COCs;
(6) Toxicity values of the COCs; and,
(7) Uncertainties in the assessments of exposure, toxicity, and general risks.

Noncarcinogenic and carcinogenic risks were calculated for the following four potential exposure groups:

(1) Current Base personnel engaged in site inspection who are exposed to surface soil, surface water and sediment;
(2) Future residents who are exposed to surface soil and ground-water;
(3) Future adolescents who are exposed to surface water and sediment through wading activities; and,
(4) Future adult construction workers who excavate for building residences.

Noncarcinogenic Risks

Unacceptable noncarcinogenic risks at OU-1 exist for the future residential adult who either ingests shallow ground-water or showers with shallow ground-water. Risk is driven by the volatile compound 1,2-dichloroethene (1,2-DCE).

Carcinogenic Risks

Carcinogenic risks were estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. The acceptable risk level expressed as a probability is one cancer incident in a million people. This level of risk is also denoted by 1 x 10-6. Risks at or below this level cannot be differentiated from the background occurrence of cancer in the population. Risks calculated in a risk assessment are potential risks and are excess (i.e., over background) cancer risks due to exposure from contaminants at the OU.

Carcinogenic risks for the exposure groups are summarized as follows:

Carcinogenic risks indicate the sources of unacceptable risks (in excess of 1 x 10-6) are due primarily to a large number of contaminants in the ground-water. These risks may be incurred during ingestion or showering with contaminated ground-water by a future resident.

In addition, there is unacceptable risk associated with the ingestion of contaminants in the surface soil (ingested by a future residential adult) and combined risks from dermal contact with surface soil. Many different types of compounds contribute to the unacceptable risk.

Ecological Risks

An ecological risk evaluation of OU-1 was based on a combination of data and literature reviews, field and laboratory analyses, analyte evaluation and screening, and preliminary risk screening. The pertinent findings are as follows:

- A variety of animal species could forage in OU-1 habitats. These range from the benthic invertebrates and amphibians inhabiting the drainage channels to birds and mammals. Any of these are potential receptors of contaminants detected at the OU.

- Rare, threatened, or endangered species are unlikely to use OU-1 for more than very transient habitat. Most of these species would not be expected to occur on OU-1 at all because of the highly altered natural environment and lack of habitat.

- Terrestrial vegetation and soil fauna communities sampled outside the burn pit and surrounding gravel area do not reveal characteristics indicating chemical-related impacts. This finding is consistent with the relatively low levels and limited distribution of contaminants in soil outside the burn-pit area, and with the active and disturbed nature of the site which appears to be the primary influence of the biotic community structure.

Interim Action Risk Reduction

The IRA will reduce risks associated with VOCs in subsurface soils present in the capillary fringe beneath the burn pit by reducing VOC concentrations in those soils. Reducing the VOC concentrations in the subsurface soils will also result in reduction of the amounts of contaminants currently available to move downward into the shallow ground-water beneath the burn pit. Removal and treatment of contaminated ground-water downgradient of the burn pit will result in reduced concentrations of contaminants in that area and reduce the rate of contaminant movement.

Subsequent actions are planned to fully address the threats posed by contaminants at OU-1. Because this remedy will result in hazardous substances remaining on the OU above health-based levels, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after commencement of the final action. Because this is a ROD for an interim action, review of this OU and of this remedy will be ongoing as the Air Force continues to develop final remedial alternatives for OU-1.

2.7 DESCRIPTION OF ALTERNATIVES

Alternative 1

- No Action

The no action alternative represents the baseline condition at OU-1 and refers to taking no further action until the final remedy is selected for OU-1.

Alternative 2:

- soil vapor extraction (SVE),
- ground-water removal using wells and an existing interceptor trench,
- treatment of ground-water, condensate, and soil gas, and,
- surface discharge of treatment effluent.

Soil Vapor Extraction

The area targeted for treatment by SVE is the burn-pit area (Figure 2-3). The number and placement of the SVE wells will be further evaluated during the design. A gravel layer that underlies the burn-pit area will be treated by SVE system. This gravel layer includes both vadose zone (unsaturated zone) and capillary fringe zone (saturated zone where ground-water is held up by capillary forces against the force of gravity) soils. The IRA will not address fill material in the burn-pit area near the surface or portions of the vadose zone in native silty clay above the gravel layer.

Ground-Water Removal

Ground-water wells will also be located in the burn-pit area. These wells will be located at some of the SVE well locations, possibly within the same well or borehole. The number and placement of wells will be evaluated during the design. The ground-water wells will collect and remove the most highly contaminated ground-water at OU-1 which is located beneath the burn-pit area. The ground-water wells will also dewater the capillary-fringe gravelly-soil layer, allowing those soils to be treated by SVE.

An existing interceptor trench will also collect a highly contaminated portion of ground-water immediately downgradient of the burn-pit area. The existing interceptor-trench sump will be provided with new pumping equipment. Pumping rates based on the 1990 treatability study involving the interceptor trench are

anticipated to be adequate to remove ground-water for this alternative.

Treatment

Extracted soil gas, and condensate from the SVE wells, and ground-water removed by wells and the interceptor trench will contain both VOCs and petroleum hydrocarbons and will be treated at a centrally located treatment plant. Water treatment will consist of gravity separation, air stripping, solids filtration, and use of liquid phase granular activated carbon. Soil gas and air stripper off-gas will be treated using a thermal oxidation unit.

Discharge of Treatment Effluent

The treatment-plant water effluent will be discharged into a drainage which flows into a retention pond (Pond 001). The effluent will be monitored prior to discharge to determine the effectiveness of the treatment system. Effluent discharge standards and monitoring will be determined during the design phase of the IRA and are subject to State and EPA reviews and approvals. The discharge will comply with the requirements of the Clean Water Act. Pond 001 effluent is regulated under the conditions of a National Primary Discharge Elimination System (NPDES) permit (SD-0000281). Off-gas from the thermal oxidizer will be monitored to ensure compliance with Federal, State, and local requirements under the provisions of the Clean Air Act.

2.8 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The NCP includes nine criteria that alternatives must be evaluated against. In the following sections, the alternatives are evaluated against each of these criteria and then against each other to determine the preferred alternative.

2.8.1 Overall Protection of Human Health and the Environment

Alternative 1 (no action) does nothing to reduce threats and potential threats to human health and the environment until the final remedy(ies) are selected and implemented.

Alternative 2 (SVE and ground-water removal and treatment) provides for removal of VOCs from soils in the capillary fringe beneath the FPTA and from shallow ground-water collected from wells in the burn-pit area and from the existing trench. This will reduce potential risks to human health. This alternative will also prevent the transport of additional contaminants from the burn-pit area.

The treatment system to be used in alternative 2 will result in a permanent reduction in source contamination in the capillary-fringe area. In addition, liquid removal will effectively limit the degree of downgradient transport of contaminants. As a result, Alternative 2 will decrease contaminant concentrations and the lateral extent of contaminant movement that present a potential health risk. During the installation of the interim remedy, the RI/FS will continue to address the remaining contamination and risk at the OU.

2.8.2 Compliance with ARARs

Applicable requirements include cleanup standards, standards of control and other substantive environmental protection requirements, criteria or limitations promulgated under Federal or State laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances at a CERCLA site. Relevant and appropriate requirements address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the environmental and technical factors at a particular site. ARARs are grouped into these three categories:

- Chemical-Specific ARARs are health or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in establishment of the amount or concentration that may be found in, or discharged to, the environment.

- Location-Specific ARARs restrict the concentration of hazardous substances or the conduct of activities solely because they are in specific locations such as flood plains, wetlands, historic places, and sensitive ecosystems or habitats.

- Action-Specific ARARs are usually technology or activity-based requirements or limitations on actions taken with respect to hazardous wastes.

Alternative 1 (no action):

There are no ARARs under this alternative since no activity would occur.

Alternative 2 (SVE and ground-water removal and treatment):

The analysis of ARARs in this document has been limited to the scope of the interim action. Other ARARs may apply to final remedies. A summary evaluation of Federal and State ARARs pertinent to this interim action is provided in Table 2-1 at the end of this section.

This alternative provides a preliminary step toward achieving chemical-specific ARARs for the shallow ground-water downgradient of the burn-pit area and the gravelly soils in the capillary fringe beneath the burn-pit area. The scope of the interim action is to prevent further transport of contaminants and to quickly achieve significant risk reduction. Restoration of ground-water to beneficial use will be addressed in the final remedy. Ground-water monitoring at OU-1 will be conducted during implementation of the IRA to determine the progress and effectiveness of the IRA. Currently, there are no Federal chemical-specific ARARs for contaminated soils. The State of South Dakota has set the maximum allowable JP-4 (as total petroleum hydrocarbons) concentration at 10,000 μg/kg for 0U-1. The interim action waiver is being invoked for the chemical-specific ARARs in soil and ground-water.

Location Specific ARARs:

National Historic Preservation Act (NHPA) of 1966 16 USC 470 et. seq) - Section 110 requires that any restoration activities will not effect the historical characteristics of the property. The building which will house the treatment system is a historical building. All external building renovations will be conducted to conform with the historical qualities of the building, thereby complying with Section 110 of the Act.

Action Specific ARARs:

Clean Water Act (CWA) - The CWA requires the establishment of guidelines and standards to control the direct or indirect discharge of pollutants to waters of the U.S. Effluent limitations developed for the containments will be applied to this point source discharge of the treated ground water. The standards of control for direct discharges are derived from Title HI of the CWA. CWA Section 301(b) requires all direct dischargers to meet technology-based requirements. These requirements include application of best available technology economically achievable (BAT). The numerical effluent discharge limits are derived by applying the levels of performance of the treatment technology to the wastewater discharge. The CWA Section 303 (b)(1)(c) requires that pollutants contained in direct discharges be controlled beyond BCT equivalents when necessary to meet applicable water-quality standards set by the State. The State water-quality standards are based on Federal water-quality criteria. To comply with this ARARs, BAT (air stripping and carbon absorption) will be used and effluent limits will be determine during the remedial design and subject to State and Federal review and approvals. The limits will be based on BAT performance and water-quality standards and criteria. All residuals from the treatment system will be disposed of according to State and Federal waste disposal requirements.

Clean Air Act (CAA) - The air emissions from the treatment system will comply with the substantive permitting process requirements for a minor source under Titles I and V of the CAA. Conditions will be placed on the emissions to prevent the source from becoming a major source or major modification. Use of thermal treatment will be provided as needed to ensure compliance.

Resource Conservation and Recovery Act - RCRA Regulations Applicable to Control Devices Required by the Organic Air Emission Standards (40 CFR parts 264 and 265 subparts AA and BB). These subparts, being relevant and appropriate to this action, apply to process vents and equipment leaks associated with air stripping operations that manage hazardous wastes with organic concentrations of at least 10 parts per million by weight.

2.8.3 Long-Term Effectiveness and Permanence

Alternative 1 delays any action until the final remedy is selected and is unlikely to provide long-term effectiveness and permanence. Contamination will move farther outward into the soil and ground-water, increasing the volume of contaminated materials and the subsequent cost of remedial actions.

Although Alternative 2 is an interim action, it will permanently remove and destroy most of the VOCs from the capillary fringe gravelly soils beneath the burn-pit area (source area) at the OU. In addition, removing ground-water immediately downgradient of the source area will prevent further downgradient movement of contaminants in ground-water from the source area while the final remedy for the OU is evaluated. Contaminants in surface and near surface soils which overlie the gravelly soils at OU-1 must be addressed in the final remedy.

Due to uncertainties in the hydrogeological characteristics of the shallow aquifer, the interim action is only focusing on containment of the source-area contamination. Information provided by the system operation will be used to evaluate potential long-term effectiveness and permanence of the interim remedy and to provide information for development of the alternatives for the final remedy. Potential inorganic contaminants must be determined and addressed by the final action implemented at OU-1.

2.8.4 Reduction of Toxicity, Mobility, and Volume Through Treatment

Alternative 1 delays reduction of toxicity, mobility, and volume since no treatment would take place. Contaminants will continue to move farther into the environment, resulting in a greater volume of contaminated materials.

Alternative 2 utilizes established treatment technologies to reduce the risks posed by the organic contaminants in the capillary fringe gravelly soils beneath the burn-pit area and in ground-water immediately downgradient of the source area.

The mass of VOCs in the gravelly soils beneath the source area will be permanently reduced through treatment and the potential for further movement of VOCs to the ground-water beneath the source area will be decreased. Also, the mass of VOCs in the removed ground-water will also be permanently reduced through treatment and the collection of ground-water near the source area prevent further downgradient movement of contaminants. VOCs in the removed soil gas and ground-water will be partitioned to the air phase and thermally destroyed. Other organic contaminants will be removed from the air phase by carbon absorption. The carbon absorbent material will be periodically disposed or reactivated. No residuals from the treatment will remain on the OU.

2.8.5 Short-Term Effectiveness

Alternative 1 will not pose any addition risks associated with the OU to human health or the environment. Delay of action allows for contaminants to move farther, offering a long term concern and no reduction in risk.

Alternative 2 will be designed to protect the community and workers during remedial actions. Worker protection will be consistent with the OSHA requirements in 29 CFR 1910.120 and the site Health and Safety Plan and Contingency Plan during construction and operation.

The air will be monitored during the construction of SVE and ground-water wells to determine that safe ambient VOC concentrations in the air are not exceeded. Soil removed during construction of the wells will be placed back onto the burn-pit area of the FPTA, graded, covered with clean fill and left in-place. All air discharges from the SVE treatment operations will be thermally treated to destroy the VOCs. No adverse environmental impacts are expected from implementation of Alternative 2 and risks associated with OU-1 source areas will be reduced. Ground-water monitoring will be conducted to assess the effectiveness of the alternative in reducing contaminant concentrations in shallow ground-water downgradient of the source area.

2.8.6 Implementability

Alternative 1 offers no implementability concerns since no action will take place.

Alternative 2 will utilize proven "off-the-shelf" technology and standard construction methods. SVE is the primary presumptive remedy identified in EPA guidance for sites with soils contaminated with VOCs. Adequate construction equipment and services are available. The equipment for on-site treatment is commercially available.

Access to the OU is available through existing roadways and the topography in the burn-pit area allows access to construction and drilling equipment. Road construction will be limited to that needed to install the treatment facilities and provide access for system monitoring and maintenance. Off-Base access for implementation of this IRA is not required since all SVE wells and the existing ground-water recovery trench are located on the Base.

Uncertainties associated with this operation involve methods to maximize the effectiveness of soil gas and ground-water removal. Changes in pumping rates, alternating operating wells and/or sporadic pumping may be necessary to determine the most effective removal methods.

The action is administratively feasible. Discharge of the treated water will comply with substantive State and Federal requirements. Amendment of the existing NPDES permit for discharge from Pond 001 may be necessary. During the remedial design phases of the IRA, discharge effluent limits for the treated ground-water will be determined. Monitoring of the treated water will be conducted to insure compliance with Federal and State discharge requirements. Also, discharge of treated air from the thermal oxidizer system

will be monitored at the thermal oxidizer stack to ensure compliance with substantive Federal, State, and local air quality requirements.

2.8.7 Cost

Alternative 1 does not result in any cost for design or implementation. The cost for quarterly monitoring (operation and maintenance) is $9,500 per quarter for a present worth cost of $36,000.

Alternative 2 is estimated to cost $1,266,000 in capital cost and $686,000 per year to operate. The operation cost represents the total operation and maintenance cost associated with the treatment facility which will be used for actions at other locations. The present worth cost for one year of operation is approximately $1.9 million. The cost presented above are the total costs for the treatment facility. These costs will be allocated among concurrent interim actions at other locations.

2.8.8 State Acceptance

The State concurs with the selected remedy. The State provided comments on the remedial investigation, focused feasibility study, Proposed Plan, and this ROD. After adequate responses to the State's comments were incorporated into the respective documents, the State concurred with the remedy.

2.8.9 Community Acceptance

Comments offered by the public were used to assess the community acceptance of the proposed alternative. The community expressed their concerns about the selected interim remedy during the public comment period. The questions and concerns of the community are discussed in detail in the Responsiveness Summary which is Appendix B of this ROD

2.9 SELECTED ALTERNATIVE

Based on the requirements of CERCLA, comparative analysis of the nine criteria, public comments, and in consultation with EPA and SDDENR, the Air Force has determined that Alternative 2 (SVE and ground-water removal and treatment) is the most appropriate alternative for the interim action. The major components of Alternative 2 are:

- soil vapor extraction (SVE),
- ground-water removal using wells and an existing interceptor trench,
- treatment of ground-water, condensate, and soil gas, and
- surface discharge of treatment effluent.

This alternative will remove some of the source contamination and contain portions of the downgradient ground-water contamination.

SVE wells will be installed in the burn-pit area of the former FPTA to remove source-area contamination from the soil. Some of the SVE wells will also be constructed to allow for the removal of contaminated ground-water beneath the burn-pit area. An existing interceptor trench, located immediately downgradient of the burn-pit area, will also collect and remove contaminated ground-water. The removed soil gas, condensate, and ground-water, containing volatile organic compounds (VOCs) and petroleum related hydrocarbons, will be treated. The liquid treatment will consist of gravity separation, air stripping, solids filtration, and use of liquid phase granular activated carbon.

The soil gas and air-stripper off-gas will be treated by thermal oxidation. The liquid effluent from this treatment system will be discharged to a natural surface water drainage. The discharge will be in compliance with the requirements of the Clean Water Act. The drainage leads to a retention pond. The discharge from the pond is regulated under the National Pollution Discharge Elimination System (NPDES) program.

<u>Remediation Goals</u>

This alternative will reduce organic contaminant concentrations in portions of OU-1 soils and ground-water, control the transport of source area contamination in the burn-pit area to ground-water and reduce the risks associated with those contaminants. Restoration is not the objective of the interim action. Contaminants will be contained during the interim action to allow for easier implementation of the final remedial action.

2.10 STATUTORY DETERMINATIONS

The selected remedy meets the statutory requirements of CERCLA as amended by SARA. These requirements include protection of human health and the environment, compliance with RAR, cost effectiveness, utilization

of permanent solutions and alternative treatment technologies to the extent practicable, and preference for treatment as a principle element. The interim action is not designed or expected to be final but the selected remedy represents the best balance of tradeoffs among the alternatives considered, with respect to pertinent criteria, given the limited scope of the action.

The manner in which the selected remedy meets each of these requirements is discussed in the sections below. The statutory determinations for the final cleanup remedy for OU-1 will be provided in the ROD for the final cleanup action, which is due in April 1996.

2.10.1 Protection of Human Health and the Environment

The selected remedy provides for removal of VOCs from subsurface gravelly soils in the capillary fringe beneath the source area and for removal and treatment of organic contaminants in shallow ground-water immediately downgradient of the source area. This will reduce potential risks to human health and retard future transport of VOCs and other organic contaminants from OU-1.

2.10.2 Compliance with ARARs

This alternative provides a preliminary step toward achieving chemical-specific ARARs for the shallow ground-water downgradient of the burn-pit area and for the gravelly soils in the capillary fringe beneath the burn-pit area. The interim-action waiver is being invoked for the chemical-specific soil and ground-water ARARs. The scope of the interim action is to prevent further transport of contaminants and to quickly achieve significant risk reduction. Restoration of ground-water to beneficial use will be addressed in the final remedy. Ground-water monitoring at OU-1 will be conducted during implementation of the IRA to determine the progress and effectiveness of the IRA. Currently, there are no federal chemical-specific ARARs for contaminated soils. The State of South Dakota has set the maximum allowable JP-4 (as total petroleum hydrocarbons) concentration at 10,000 μg/kg for OU-1.

Location Specific ARARs:

National Historic Preservation Act (NHPA) of 1966 16 USC 470 et.seq) - Section 110 requires that any restoration activities will not effect the historical characteristics of the property. The building which will house the treatment system is a historical building. All external building renovations will be conducted to conform with the historical qualities of the building, thereby complying with Section 110 of the Act.

Action Specific ARARs:

Clean Water Act (CWA) - The CWA requires the establishment of guidelines and standards to control the direct or indirect discharge of pollutants to waters of the U.S. Effluent limitations developed for the containments will be applied to this point source discharge of the treated ground water. The standards of control for direct discharges are derived from Title III of the CWA. CWA Section 301(b) requires all direct dischargers to meet technology-based requirements. These requirements include application of best available technology economically achievable (BAT). The numerical effluent discharge limits are derived by applying the levels of performance of the treatment technology to the wastewater discharge. The CWA Section 303 (b)(1)(C) requires that pollutants contained in direct discharges be controlled beyond BCT equivalents when necessary to meet applicable water-quality standards set by the State. The State water-quality standards are based on Federal water-quality criteria. To comply with this ARAR, BAT (air stripping and carbon absorption) will be used and effluent limits will be determine during the remedial design and subject to State and Federal review and approvals. The limits will be based on BAT performance and water-quality standards and criteria. All residuals from the treatment system will be disposed of according to State and Federal waste disposal requirements.

Clean Air Act (CAA) - The air emissions from the treatment system will comply with the substantive permitting process requirements for a minor source under Titles I and V of the CAA. Conditions will be placed on the emissions to prevent the source from becoming a major source or major modification. Use of thermal treatment will be provided as needed to ensure compliance.

Resource Conservation and Recovery Act - RCRA Regulations Applicable to Control Devices Required by the Organic Air Emission Standards (40 CFR parts 264 and 265 subparts AA and BB). These subparts, being relevant and appropriate to this action, apply to process vents and equipment leaks associated with air stripping operations that manage hazardous wastes with organic concentrations of at least 10 parts per million by weight.

2.10.3 Cost Effectiveness

The selected remedy will permanently remove much of the VOCs from the capillary fringe zone beneath the burn-pit area and immediately south of the source area and reduce future costs associated with the final cleanup remedy(ies) selected for OU-1. This alternative is cost effective since a net present worth cost for one year of operation of the alternative of $1,888,400 will remove a large quantity of contamination from the subsurface. This alternative will also allow for easier implementation of the final remedial action.

2.10.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Extent Possible

As this is an interim action, the selected remedy is not designed or expected to be final. The selected remedy utilizes established treatment technologies to address the principal threats posed by the VOCs in subsurface soils beneath the source area and by organic contaminants in shallow ground-water downgradient of the source area and will reduce the amount and mobility of contaminants present at OU-1

2.10.5 Preference for Treatment as a Principal Element

VOCs in the removed ground-water will be partitioned to the air phase and thermally destroyed. VOCs carried by the removed soil gas will be thermally treated. Other organic contaminants will be removed by carbon absorption. The preference for treatment as a principal element has been satisfied.

2.11 DOCUMENTATION OF SIGNIFICANT CHANGES

The selected interim action is the same as the preferred alternative presented in the Proposed Plan for interim action. There have been no changes relative to the Proposed Plan.

TABLE 2-1 EVALUATION OF FEDERAL AND STATE ARARS THAT MAY APPLY TO OU-1, ELLSWORTH AFB, SOUTH DAKOTA

Potentially Applicable or Relevant and Appropriate Federal Standards, Requirements, Criteria and Limitations

Standard, Requirement, Criteria or Limitation	Citations	Description	ARAR Type	Applicability
Safe Drinking Water Act	42 USC 300, f, g			
National Primary Drinking Water Standards	40 CFR Part 141	Establishes health based standards for public water systems (maximum contaminant levels)	Chemical	Relevant and appropriate for federal Class II aquifers.
National Secondary Drinking Water Standards	40 CFR Part 143	Establishes aesthetic based standards for public water systems (maximum contaminant levels)	Chemical	Relevant and appropriate.
Maximum Contaminant Level Goals	Public Law No. 99-330, 100 Stat. 642 (1986)	Establishes drinking water quality goals set at concentrations of unknown or anticipated adverse health effects with an adequate margin of safety	Chemical	Relevant and appropriate.
Clean Water Act Water Quality Criteria	33 USC 1251-1376 40 CFR Part 131	Establishes criteria for water quality based on toxicity to aquatic organisms and human health	Chemical	Relevant and appropriate. Aquifer may be a federal Class II A (discharge to surface water)
Criteria and Standards for the National Pollutant Discharge Elimination System	40 CFR Part 125	Establishes criteria and standards for technology-based requirements in permits under the Clean Water Act	Chemical	Applicable; potential discharge stream or to EAFB WWTP.
General Pretreatment Regulations for Existing and New Sources of Pollution	40 CFR Part 403	Establishes responsibilities of federal, state and local government and of the POTW in providing guidelines for and developing, submitting, approving and modifying state pretreatment programs. Specifies standards for pretreatment	Action	Applicable; potential discharge to EAFB WWTE
Guidelines Establishing Test Procedures for Analyses of Pollutants	40 CFR Part 136	Specifies analytical procedures for NPDES applications and reports	Action	Applicable because of treatment and discharge of ground-water.
Clean Air Act	(see below)			
National Primary and Secondary Ambient Air Quality Standards	40 CFR Part 50	Establishes standards for ambient air quality to protect public health and welfare	Action	Applicable.

TABLE 2-1 EVALUATION OF FEDERAL AND STATE ARARS THAT MAY APPLY TO OU-1, ELLSWORTH AFB, SOUTH DAKOTA (Continued)

Potentially Applicable or Relevant and Appropriate Federal Standards, Requirements, Criteria and Limitations

Standard, Requirement, Criteria or Limitation	Citations	Description	ARAR Type	Applicability
National Emission Standards for Hazardous Air Pollutants	40 CFR Part 61	Establishes regulatory standards for specific air pollutants	Action	Applicable. Alternative would require discharge to air following treatment.
Resource Conservation and Recovery Act	(see below)			
Land Disposal Restrictions	40 CFR Part 268	Identifies hazardous wastes that are restricted from land disposal and defines limited circumstances when a prohibited waste may continue to be land disposed	Action	Relevant and appropriate. Alternative may include disposal of residual waste due to treatment
Hazardous Waste Management System: General	40 CFR Part 260	Establishes definitions, procedures and criteria for modification of any provision in 40 CFR Parts 260-265	Action	Applicable.
Identification and Listing of Hazardous Wastes	40 CFR Part 261	Defines those solid wastes which are subject to regulation as hazardous wastes under 40 CFR Parts 262-265	Action	Applicable.
Standards Applicable to Generators of Hazardous Wastes	40 CFR Part 262	Establishes standards for generators of hazardous waste	Action	Applicable.
Standards Applicable to Transporters of Hazardous Wastes	40 CFR Part 263	Establishes standards which apply to persons transporting hazardous waste within the U. S. if the transportation requires a manifest under 40 CFR Part 262	Action	Applicable.
Toxic Substances Control Act	40 CFR Part 761	Substances regulated include, but are not limited to, soils and other materials contaminated as a result of spills	Action	Applicable.
Archaeological and Historic Preservation Act	16 USC 469 40 CFR Part 6.301 (c)	Establishes procedures to provide for preservation of historical and archaeological data which might be destroyed through alteration often rain as a result of a federal construction project for a federal licensed activity or program	Location	Potential ARAR. OU-1 was used for fire training activities. No known historic or archaeological value. Confirmation study has not been performed.
National Historic Preservation Act	16 USC 470	Addresses preservation of historic resources and development of preservation programs.	Location	Applicable.

TABLE 2-1 EVALUATION OF FEDERAL AND STATE ARARS THAT MAY APPLY TO OU-1, ELLSWORTH AFB, SOUTH DAKOTA (Continued)

Potentially Applicable or Relevant and Appropriate Federal Standards, Requirements, Criteria and Limitations

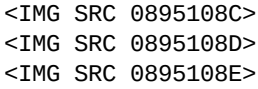
Standard, Requirement, Criteria or Limitation	Citations	Description	ARAR Type	Applicability
Executive Order on Protection of Wetlands	E. O No. 11,990 40 CFR 6.302(a) & Appendix A	Requires federal agencies to avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practicable alternative exists	Action/Location	Potential ARAR; OU-1 has wetland areas adjacent to potential remediation areas.
South Dakota Air Pollution Control Regulations	74:26:01:09, 24-28	Establishes permit requirements for construction, amendment and operation of air discharge services	Action	Applicable.
South Dakota Water Discharge Permit Rules	74:03:18:01-17	Establishes surface water discharge permit application requirements	Action	Applicable.
South Dakota Water Discharge Permit Rules	74:03:19:01-08	Establishes surface water permit conditions	Action	Applicable.
South Dakota Water Discharge Permit Rules	74:03:01	Establishes requirements for individual and small on-site wastewater systems	Action	Applicable.
South Dakota Water Quality Standards	74:03:04:02, 10	Defines use of Box Elder Creek and certain tributaries	Action	Relevant and appropriate.
South Dakota Surface Water Quality Standards	74:03:02	Establishes surface water quality standards	Action	Applicable.
South Dakota Remediation Criteria for Petroleum-Contaminated Soils	74:03:32	Establishes requirements for remediation of soil contaminated with petroleum products	Chemical	Relevant and appropriate. OU-I has had impacts from petroleum products used during fire training activities.
South Dakota Ground-Water Standards	74:03:15	Defines ground-water classifications by beneficial use and sels chemical standards	Chemical	Relevant and appropriate.

3.0 LIST OF ACRONYMS AND ABBREVIATIONS

ACC:	Air Combat Command
AF:	Air Force
AFB:	Air Force Base
ARARs:	Applicable or Relevant and Appropriate Requirements
CERCLA:	Comprehensive Environmental Response, Compensation and Liability Act
COC:	Chemicals of Concern
DNAPL:	Dense non-aqueous phase liquid
EAFB:	Ellsworth Air Force Base
EP:	Extraction Procedure, the EPA's standard laboratory procedure for leachate generation.
EPA:	Environmental Protection Agency
FFA:	Federal Facilities Agreement
FPTA:	Fire Protection Training Area
FTA:	Fire Training Area
GPR:	Ground Penetrating Radar
HQ:	Headquarters
IN SITU	In the original place.
IRIS:	Integrated Risk Information System
IRP:	Installation Restoration Program
JP-4:	Jet Propulsion Fuel Number Four; contains both kerosene and gasoline fractions.
LNAPL:	Light Non-Aqueous Phase Liquid
MCL:	Maximum Contaminant Levels
mgd:	Million Gallons per Day
µg/l:	Micrograms per liter
mg/l:	Milligrams per liter
MSL:	Mean Sea Level
NAPL:	Non Aqueous Phase Liquid
NCP:	National 0il and Hazardous Substances Contingency Plan
NEPA:	National Environmental Policy Act
NPDES:	National Pollutant Discharge Elimination System
NPDWR:	National Primary Drinking Water Regulations
NPL:	National Priorities List
OU:	Operable Unit
O&G:	Symbols for oil and grease
PAH:	Polynuclear Aromatic Hydrocarbon
PCB:	Polychlorinated Biphenyl; liquids used as a dielectrics in electrical equipment
PCE:	Perchloroethylene; liquids used in degreasing or paint removal.
PL:	Public Law
ppm:	Parts per million by weight
RCRA:	Resource Conservation and Recovery Act
RI/FS:	Remedial Investigation/Feasibility Study
SARA:	Superfund Amendments and Reauthorization Act
SACM:	Superfund Accelerated Cleanup Model
SVOC:	Semivolatile Organic Compound
TCA:	1, 1, 1,-Tetrachloroethane
TCE:	Trichloroethylene
TCL:	Target Compound List
TCLP:	Toxicity Characteristic Leaching Procedure
TDS:	Total Dissolved Solids
TOC:	Total Organic Carbon
TSD:	Treatment, storage or disposal sites/methods
USAF:	United States Air Force
USEPA:	United States Environmental Protection Agency
USDA:	United States Department of Agriculture
USFWS:	United States Fish and Wildlife Service
USGS:	United States Geological Survey
VES:	Vertical Electrical Sounding
VOC'	Volatile Organic Compound
WQC:	Water Quality Criteria
WWTP:	Wastewater Treatment Plant

APPENDIX A

FIGURES



Appendix B

Responsive Summary
Interim Actions at Operable Units One and Four
Ellsworth Air Force Base, South Dakota

1. Overview

Ellsworth Air Force Base (EAFB), with the approval of the U.S. EPA and State of South Dakota, held one Public Meeting to cover both of the interim action Proposed Plans for Operable Units (OUs) 1 and 4. This procedure was agreed upon due to the similarities of the two actions and the use of one treatment plant for cleaning up the ground water. As a result, the comments received at the Public Meeting are, for the most part, related to both OUs. Rather than attempt to separate these comments and answers by OU, identical Responsiveness Summaries were used for each ROD.

The public has reviewed the Proposed Plans and the interim remedial actions and is in general support of implementing the interim actions.

The Responsiveness Summary provides a summary of comments and questions received from the community at the public meeting and during the public comment period as well as the United States Air Force's (USAF's) responses to public comments.

The Responsiveness Summary is organized into the following sections:

- Background on Community Involvement
- Summary of Comments and Questions Received During the Public Comment Period and USAF Responses
- Remaining Concerns

2. Background on Community Involvement

On August 30, 1990 EAFB was listed on the USEPA's National Priorities List (NPL). A Federal Facilities Agreement (FFA) was signed in January 1992 by the Air Force, EPA, and the State and went into effect on April 1, 1992. The FFA establishes a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions for EAFB.

Community relations activities that have taken place at EAFB to date include:

- FFA process. After preparation of the FFA by the USAF, EPA, and SDDENR the document was published for comment.
- Administrative Record. An Administrative Record for information was established in Building 8203 at EAFB. This repository contains information used to support USAF decision-making
- Information repositories. An administrative Record outline is located at the Rapid City Library (public repository).
- Community Relations Plan (CRP). The draft final CRP was submitted on October 26, 1992 to the EPA and the State of South Dakota. The EPA and State have approved the CRP. An update to this plan will be prepared in 1995.
- Restoration Advisory Board (RAB). The RAB has been formed to facilitate public involvement in the cleanup and has meetings quarterly. In addition to USAF, EPA, and South Dakota oversight personnel, the RAB includes community leaders and local representatives from the surrounding area.
- Mailing list. A mailing list of all interested parties in the community is maintained by the Base and updated regularly.
- Fact sheets. A fact sheet describing the status of the IRP at the Base was distributed to the mailing list addressees in 1992.
- Open house. An informational meeting on the status of the IRP and other environmental efforts at the Base was held on May 6, 1993.
- Newspaper articles. Articles have been written for the Base newspaper regarding IRP activity.

- Proposed Plan. The proposed plan on this action was distributed to the mailing list addressees for their comments.

The Proposed Plans for these interim actions were distributed to the mailing list addressees for their comments and additional copies of the Proposed Plans were available at the April 18, 1995 public meeting. A transcript of comments, questions and responses provided during the public meeting was prepared.

The USAF established a public comment period from March 25, 1995 to April 24, 1995 for interested parties to review and comment on interim cleanup alternatives considered and described in the Proposed Plans for OU-1 and OU-4. The Proposed Plans were prepared by the USAF in cooperation with the EPA and SDDENR.

The USAF also held a public meeting at 8:00 p.m. on April 18, 1995 in the 28th Bomb Wing Auditorium at EAFB to outline the proposed interim remedies to reduce risk and control potential hazards at the two OUs.

3. Summary of Comments and Questions Received During the Public Comment Period and USAF Responses

Part I - Summary and Response to Local Community Concerns

Review of the written transcript of the public meeting and of written comments received during the public comment period did not indicate community objections to the proposed interim actions.

The majority of the comments received during the public meeting were in the form of questions about the interim actions (what would be done, how it would done, when it would be started and completed and what effects the actions might have); questions about existing data and collection of additional data; and, questions about on-going Base operations. Representatives of the USAF and USEPA were available to provide answers to the questions and also provided an overview presentation during the meeting to describe the interim actions.

Part II - Comprehensive Response to Specific Technical, Legal and Miscellaneous Questions

The comments and questions below have been numbered in the order they appear in the written transcript of the April 18, 1995 public meeting. Written comments received during the public comment period are so noted at the end of the comment summaries.

Comment 1. Eris Johnson

Asked why ground water quality sampling results collected in 1990 seem so much different (lower) compared to results from samples collected through 1994.

Response 1: The data collected in 1993 and 1994 was subjected to rigorous quality control and quality assurance requirements that were mandated for this project and the analyses were performed in accordance with approved US EPA methods. It is possible different types of tests and methods were used in 1990 which could cause differences in the reported results. Differences in sampling locations, natural concentration variations and natural degradation of some of the organic compounds over time could also have resulted in the differences.

Comment 2. Eris Johnson

Asked if the proposed interim actions would remove contaminants from soils.

Response 2: Removal and treatment of both soil (by soil vapor extraction) and ground water contaminants will occur during the interim actions at 0U-1; removal and treatment of ground water contaminants will occur during interim actions at OU-4. Remaining contamination at OU-4 will be evaluated as part of the final action at OU-4.

Comment 3. Eris Johnson

Expressed concern about wind-borne contaminants causing exposure and risk to downwind, off-Base residents during construction activities for the interim actions.

Response 3: Air quality monitoring will be conducted as construction proceeds and, if hazardous levels are detected, measures will be taken to ensure operations do not endanger on-site workers or off-Base residents.

Comment 4. John Luxem

Asked if his currently out-of-service well west of OU-4 might be useful as a ground water extraction well.

Response 4: Possible use of the well for that purpose will be evaluated as part of the interim action for OU-4; if the well cannot be used as an extraction well, a new extraction well will be constructed in the same general vicinity.

Comment 5. Pat O'Gorman

Asked what the time-frame was for starting the interim actions.

Response 5:

The USAF plans to begin construction at the end of May, 1995.

Comment 6. Jan Deming

Asked if the monitoring and residential wells would continue to be sampled during the interim cleanup actions.

Response 6: Sampling of residential wells has been done in the past; installation of the water line for some residents will decrease the need for future sampling of domestic wells in those areas. However, current plans are to continue off-Base sampling through the first quarter of 1996.

Comment 7. Marsha Amo

Asked how ground water flow directions were determined, whether flow directions are affected by rainfall and whether ground water contamination was affecting surface water (creeks) in the area.

Response 7: Ground water elevations were measured over time and the results were plotted on maps. A triangulation technique is then used to determine flow direction. This is the standard method of determining flow direction. In general, flow direction usually follows the topography of the land; i.e. from higher points to lower points. Data from pumping tests was used to estimate the rate that ground water flows through the subsurface material. Precipitation can affect the rate of flow at any given time but not necessarily the direction of flow. Surface water contamination was found to be mainly caused by surface water runoff rather then by ground water contamination.

Comment 8. Marsha Amo

Asked what kinds of chemicals are used to wash off the Base runways.

Response 8: Potassium acetate is used infrequently (once last year for instance) for deicing the runways. In addition, an EPA-approved detergent is used two or three times a year to wash rubber off the runways. It is applied with spraying equipment, scrubbed with brushes and vacuumed up when the USAF crew is done.

Comment 9. Phyllis Engleman

Asked if the city (Box Elder) wells had been tested for contaminants from the Base and if they were in any danger.

Response 9: The Box Elder city wells are all well outside of the known limits of Base-related contamination and are not in any danger of being affected by contamination from the Base.

Comment 10. Jan Deming

Asked how close wells could be placed in relation to OU-1 and OU-4 and whether the county was involved in placing restrictions on well development in the area.

Response 10: Even with the aid of computer models available, it would be very difficult to predict what a safe distance might be for well placement in the area. The USAF has no control over off-Base activities and residents are encouraged to work with the county concerning development in the area.

Comment 11. Lee Weimer

Asked what kinds of systems, products and procedures have been put into use at the Base to prevent future, costly releases of materials from the Base?

Response 11: Several changes have been implemented to more tightly control the use and distribution of chemicals and other materials at the Base. Examples include use of a centralized purchasing and distribution system for materials to control the types and amounts of chemicals being used for a given purpose Education

and recycling programs are also in place to reduce use of materials and to encourage responsible handling of the materials in use.

Comment 12. Eris Johnson

Asked if water being provided by the Base to residents in the area was free or whether it had to be purchased and whether the Base would provide water to future new homes in the area.

Response 12: At the current time, water is being provided at no charge to the residents and the Base is evaluating the issue of providing water to future new homes.

Comment 13. Mary McGriff

Asked whether drainage area near the Base gate (Crum property) had been sampled and whether or not the discharge water from the Base wastewater treatment plant was a concern.

Response 13: Sampling in that area is planned but has not yet been scheduled. The discharge from the treatment plant is monitored regularly and must meet discharge restrictions required by US EPA

Comment 14. John Osnes

Asked what the anticipated duration of the interim actions would be.

Response 14: The duration is difficult to estimate at this time and will be different at each of the sites with some sites requiring longer amounts of time than others. The progress and effectiveness of each action will be monitored closely and adjusted as needed to reduce the problems as quickly as possible.

Comment 15. Eris Johnson

Asked about the pumping rate for the ground water extraction systems and the potential for the eventual dewatering of private wells to the south of the Base.

Response 15: The total design withdrawal rate is on the order of from 50 to 100 gallons per minute. Water levels in the extraction area will go down over time which will accelerate the biological degradation of contaminants in soils as contaminated ground water is being removed and treated. If off-Base wells are adversely impacted by the interim actions, the USAF will take measures to supply water to affected parties.

Comment 16. Jim Corbett

Asked if the extracted ground water would be pumped into Box Elder Creek and whether the proposed technology had been used successfully elsewhere.

Response 16: All of the extracted water will be treated in the treatment facility that will be constructed and the treated water must meet applicable US EPA standards before being discharged to an unnamed tributary that drains to Box Elder Creek. Pump and treat ground water systems and soil vapor extraction systems are standard technologies in use throughout the nation today. A regional example of a similar system is operating at the Hill Air Force Base near Salt Lake City, Utah

Comment 17. Eris Johnson

Asked if air stripping is safe.

Response 17: Yes; if the air from the stripper is contaminated at high levels, it has to be treated (burned essentially) using a thermal oxidizer before the air is discharged to the environment.

Comment 18. Marsha Amo

Asked if there are plans to remove and clean contaminated soil.

Response 18: Soil removal and treatment is not part of the proposed interim action but will be evaluated during consideration of the future final remedy.

Comment 19. Bob Mallow

Asked if fuel-contaminated soil could be treated by aerating it.

Response 19: Yes it can, depending on soil conditions and that is one of the alternatives being considered in review of the final remedy.

Comment 20. Jim Corbett

Asked how contamination levels at Ellsworth compared to contamination at other Air Force Bases.

Response 20: Some Bases have more serious problems while other Bases have less serious problems. Ellsworth is fortunate to have the funding in place to investigate and begin correcting contamination problems now.

Comment 21. Marcia Elkins

Asked how the extracted water would be transported to the treatment facility.

Response 21: The water will be pumped through double-walled pipe to the treatment plant.

Comment 22 (Written). Michael McMahon, Western Pennington Flood Management Commission, Rapid City, SD - letter of April 11, 1995

Asked if it would be feasible to inject treated ground water into a series of wells upgradient of the contaminant plume to promote more rapid cleanup or, alternatively, providing the treated water to local ranchers and farmers for livestock or irrigation use.

Response 22: Because of the variability in the near surface geology at Ellsworth and the desire to implement the interim actions as quickly as possible (without the time for studies to adequately evaluate and implement a reinjection system), reinjection was not considered for the interim actions. Reinjection would need to be studied closely because of concerns over the potential for negative impacts. Reinjection would change the local ground water flow environment and could result in the spread of contamination. The feasibility of reinjection will be evaluated for the final actions at OU-1 and OU-4. The near-Base residents to the south and west of the sites are currently provided with water supplied by the Base. As such, they would have no current need to use the treated water for livestock or irrigation purposes

Comment 23 (Written). Perry H. Rahn, Ph.D., P.E., Professor, South Dakota School of Mines and Technology, Rapid City, SD - letter of April 20, 1995

Suggested using site geologic data to make isopach maps of the subsurface gravel unit and using a mathematical model to better define the ground water flow environment.

Response 23: The interim action ground water extraction components were designed with the aid of a simple analytical computer model. The gravel thickness varies greatly across the Base and there is a significant level of heterogeneity within both the gravel and the fractured shale units which make up the aquifer. The hydraulic conductivity and saturated thickness vary greatly at any given operable unit and even between adjacent borehole locations due to a significant variation in clay content in the gravel and fracturing in the shale. For these reasons, it may be difficult to make a useful isopach map and may not be practical to perform more rigorous modeling. More information will become available with the operation the interim action ground water extraction components and that information will be used to design the final remedial action components at the Base.

Comment 24 (Written). James R.D. Cox, CET, Quality Assurance Manager, Engineers Technical Services, Plantation, Florida - letter of April 24, 1995

The commenter indicated that in 1985, a contractor performing runway rehabilitation and upgrading at the Base placed soil, concrete and asphalt debris on property located west of OU- 1 and now owned by the commenter and Michael J.D. Cox. Concern was expressed that the property is located in close proximity to an area being investigated for ground water contamination, material from a Superfund site had been placed on the property and no sampling or testing was performed on the property.

Response 24: An extensive remedial investigation was performed at Ellsworth in 1993 and 1994 which included the collection of numerous soil, sediment, surface water and ground water samples. The USAF, with the concurrence of the USEPA and the SDDENR, believes sufficient data was collected to determine the extent and magnitude of contamination associated with OU-1 and OU4 and to develop several effective alternatives for cleaning up the contamination. Review of the information collected during the investigation indicated ground water contaminant plumes are present to the south and southwest of the southwest corner of OU-4. The plume to the southwest of OU-4 was shown to be located east of the apparent location of the commenter's property. The interim action proposed for OU-4 will address ground water contamination to the south of OU-4. The final action for OU-4 will address cleanup of the plumes located to the south and to the southwest of OU-4. Authorized or unauthorized placement of construction debris on the commenter's property is not part of either

the interim remedy or the final remedy selection process and would be more appropriately addressed by other means available to the commenter.

4. Remaining Concerns

Based on review of the transcript of the oral comments received during the public meeting and of the written comments received during the public comment period, there are no outstanding issues associated with implementation of the proposed interim actions. Remaining concerns related to implementation of the interim actions will be addressed by: performing air monitoring during construction and operation of the system components as needed to protect on-site workers and off-Base residents; collection of samples from a drainage area near the Base gate; and, collection of system operation and monitoring data to determine the effectiveness of the interim actions in the future.